

WHAT IS CLAIMED IS:

1. A method of fabricating a patterned polymer film, the method comprising:  
filling particles in a pattern provided to a soft polymer mold, to prepare an embossed stamp;  
placing the embossed stamp on a polymer film;  
allowing the embossed stamp placed on the polymer film to stand at temperatures higher than a glass transfer temperature of the polymer film; and  
removing the embossed stamp from the polymer film.
2. The method of claim 1, further comprising, after the filling, coating a polymer impregnation-prevention layer on the pattern.
3. The method of claim 2, wherein the polymer impregnation-prevention layer comprises a metal selected from the group consisting of gold, silver, palladium, copper, chromium and titanium.
4. The method of claim 1, wherein the soft polymer mold is formed by any of a replica molding process, an imprinting process, a capillary micromolding process, a transfer molding process, a decal transfer molding process and a solvent-assisted micromolding process.
5. The method of claim 1, wherein the particles are selected from the group consisting of polymer beads, metallic materials, ceramic particles, and mixtures thereof.
6. The method of claim 1, wherein the filling is performed by a process selected from the group consisting of a dip coating process, a spin coating process, and a capillary flowing process.

7. The method of claim 1, wherein the polymer film comprises a polymer selected from the group consisting of polystyrene, polymethylmethacrylate, polyacrylate, polyurea, polyurethane, epoxy, polydimethylsiloxane, polyacrylamide, polyvinylalcohol, polybutadiene, polypropylene, polyethylene, polyethyleneoxide, and copolymers thereof.
8. A method of fabricating a patterned polymer film, the method comprising:  
filling particles in a pattern provided to a soft polymer mold, to prepare an embossed stamp;  
placing the embossed stamp on a coating layer of a polymer precursor formed on a substrate;  
curing the coating layer; and  
removing the embossed stamp from the cured coating layer.
9. The method of claim 8, further comprising, after the filling, coating a polymer impregnation-preventing layer on the pattern.
10. The method of claim 9, wherein the polymer impregnation-prevention layer includes any of gold, silver, palladium, copper, chromium and titanium.
11. The method of claim 8, wherein the soft polymer mold is formed by any of a replica molding process, an imprinting process, a capillary micromolding process, a transfer molding process, a decal transfer molding process, and a solvent-assisted micromolding process.
12. The method of claim 8, wherein the particles include any of polymer beads, metal materials, ceramic particles and mixtures thereof.

13. The method of claim 8, wherein the filling includes any of a dip coating process, a spin coating process, and a capillary flowing process.
14. The method of claim 8, wherein the polymer precursor comprises of polystyrene, polymethylmethacrylate, polyacrylate, polyurea, polyurethane, epoxy, polydimethylsiloxane, polyacrylamide, polyvinylalcohol, polybutadiene, polypropylene, polyethylene, polyethyleneoxide, and copolymers thereof.